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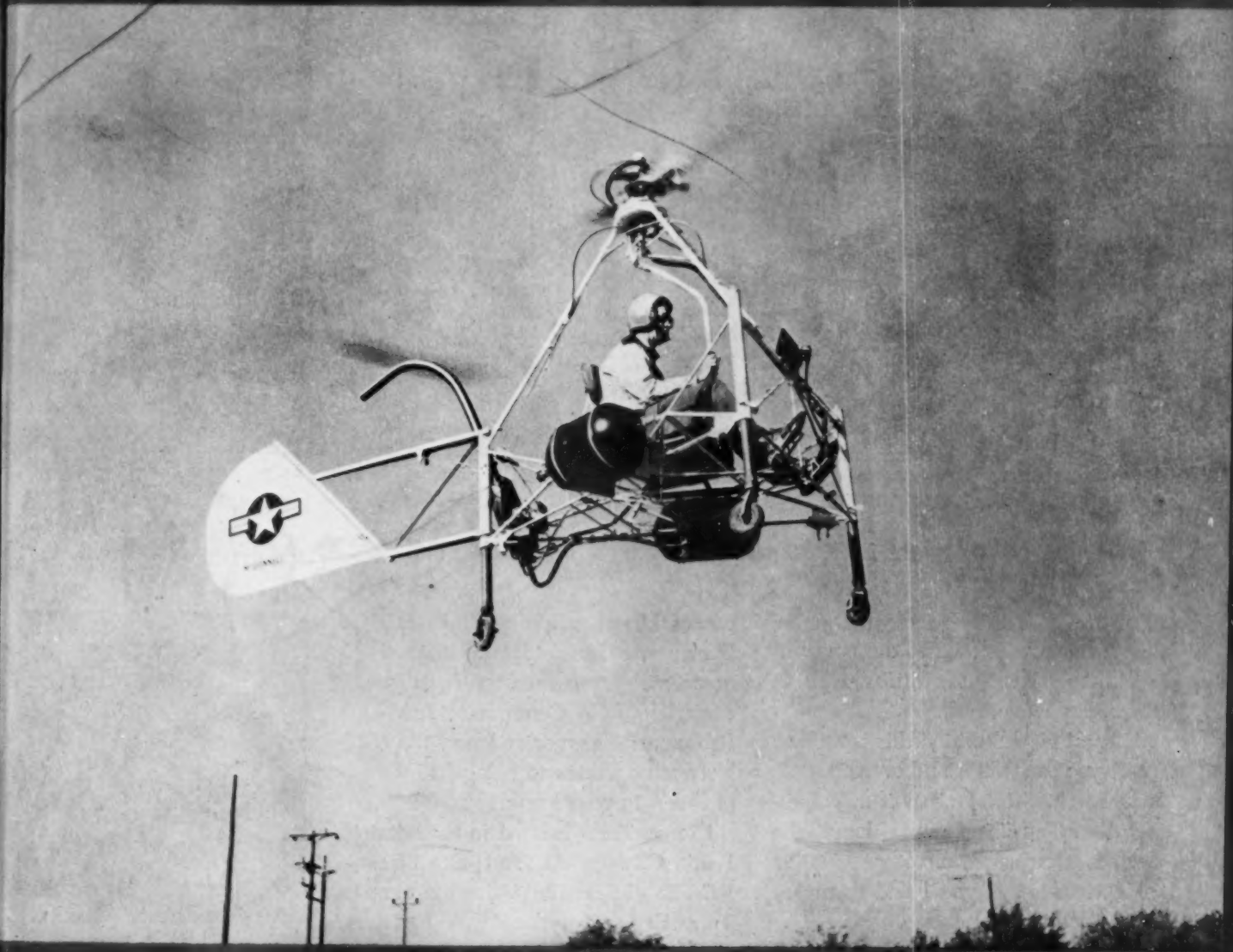
TECHNOLOGY DEPARTMENT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • DEC. 6, 1947



Jet Helicopter

See Page 360

A SCIENCE SERVICE PUBLICATION

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MEDICINE

Extract May Save Babies

One in every 170 babies are threatened with Rh blood death which might be averted with a red blood cell extract being made in Baltimore and Pittsburgh.

➤ A RED blood cell extract which may save babies from Rh blood death is now being made in the Baltimore Rh typing laboratory, Dr. Milton S. Sacks, University of Maryland Medical School scientist who is head of the laboratory, announced at the meeting of the Southern Medical Association at Baltimore.

One in every 170 babies is threatened with this death, the Baltimore laboratory found in a study of some 30,000 expectant mothers.

The death is due to a condition called congenital hemolytic disease of the newborn. It occurs when the unborn baby has inherited Rh positive blood from its father while the mother has Rh negative blood. The mother develops antibodies to her unborn baby's Rh positive blood, just as a person develops antibodies against typhoid germs after vaccination. But these anti-Rh antibodies get into the unborn baby's blood and gradually destroy his red blood cells.

The blood extract Dr. Sacks is working on would neutralize the anti-Rh material in the mother's blood and prevent its harmful effect on the baby. It is made from Rh positive blood cells. It was first made and reported by Mrs. Bettina B. Carter of the Western Pennsylvania Hospital Institute of Pathology at Pittsburgh. Dr. Sacks emphasized that the work is still experimental, and he does not know yet whether the extract will be successful.

Chief weapon doctors now have for fighting the Rh danger is to test the expectant mother's blood so they can be prepared to handle Rh trouble in the baby when it is born. If the mother is Rh negative and develops strongly anti-Rh blood, it may be necessary to change the baby's blood when it is born. This is done by draining all its Rh positive blood and replacing it simultaneously with Rh negative blood.

Persons who have repeated transfusions of whole blood as well as expectant mothers may have Rh trouble, Dr. Sacks pointed out. Most people, 85%, have Rh positive blood, but if one of the Rh negatives gets many transfusions of Rh positive blood, he will develop antibodies against the latter. Then, when he gets another transfusion of Rh positive blood, he may have a serious reaction.

Mrs. Carter and Dr. Joseph Loughrey, Pittsburgh obstetrician, have been using her red cell extract for a number of months. It has been given to expectant mothers to prevent development of Rh trouble in the babies before they are born and has also been given to babies with this dangerous condition after they were born.

Results have been promising with both methods of giving the extract. It may therefore become both a cure and a preventive. But Mrs. Carter, like Dr. Sacks who has been following her work, says that it is still experimental.

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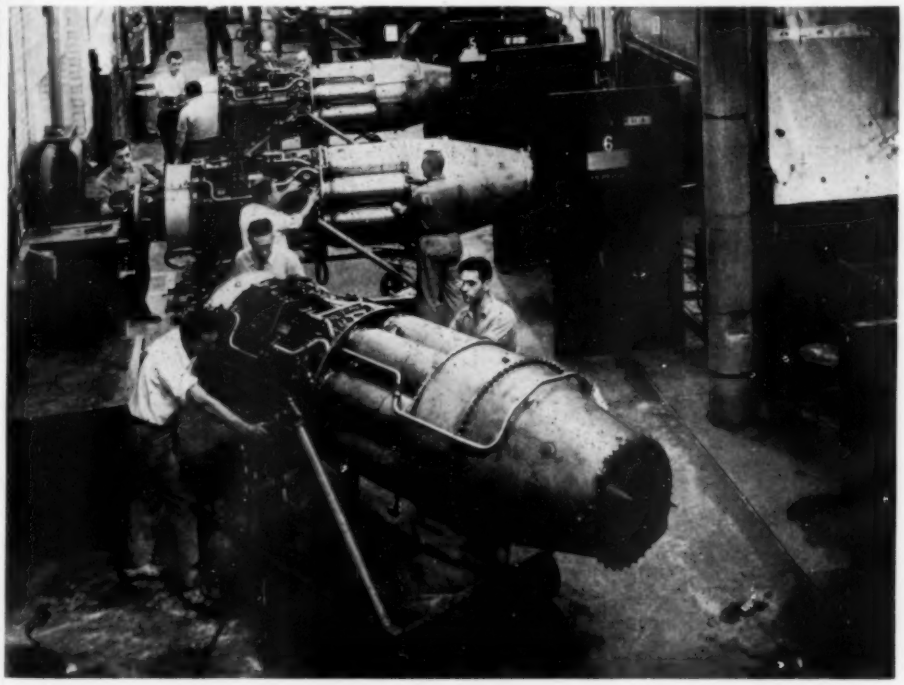

***JET ENGINES**—These torpedo-shaped power-plants are used in 10 different types of jet-propelled military aircraft, ranging from single-engine fighters to a series of two, four, six and eight-engined bombers. The Navy's Douglas Skystreak is among the aircraft powered with this jet engine, known in the Air Force as the J-35.*

MEDICINE

Lead Poisoning Cured By War Gas Antidote

➤ LEAD poisoning, once rated a hopeless disease afflicting painters, has been cured by use of a chemical developed during the war to combat war gas.

Complete recovery of a lead-poisoned sailor followed his treatment with BAL, or British Anti-Lewisite, the medical profession was told by Dr. James G. Telfer, U. S. Public Health Service surgeon, in a report to the *Journal of the American Medical Association* (Nov. 29).

BAL has proved effective previously in treating poisoning due to mercury, arsenic and other heavy metals. The BAL chemical literally pulls the lead out of the bones and tissues of the victim's body.

The patient was a boatswain who mixed all the paint used on board his ship, making a special effort to get "good lead paint." He mixed the paints in a small, poorly ventilated space and also stated that he sometimes ate without washing the paint off his hands. He was brought to the U. S. Marine Hospital in San Francisco because of his vomiting, diarrhea and cramps.

Lead poisoning was suspected because of his "pasty" appearance, presence of a "lead line," consisting of a narrow margin of tiny gray or black spots near the edge of the gums, pain in the abdomen

and his exposure to lead. It was only after he received injections of BAL that the diagnosis of lead poisoning was confirmed, since the drug increased the discharge of lead from the points of concentration in the body.

This action of BAL's is an aid to diagnosis, since the amount of lead excreted can be measured by laboratory methods and thus confirms what is only suspected on the basis of a physical examination.

Two weeks after the first injections of BAL the patient again received the drug. Treatment lasted for five days, after which he was well and was dismissed.

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MEDICINE

Lessen Appendix Hazard

A striking reduction in deaths from ruptured appendix has resulted from improvements in caring for patients but delays in seeking treatment are still killing many.

➤ IMPROVEMENTS in caring for patients operated on for ruptured appendix have brought a striking reduction in deaths, but delay in calling a doctor and going to the hospital is still killing many, Drs. Edward S. Stafford and H. William Scott of the Johns Hopkins University School of Medicine and Hospital told members of the Southern Medical Association meeting in Baltimore.

Twenty years ago, patients operated on at Johns Hopkins for appendicitis with perforation, or rupture, of the appendix, died at the rate of 18.8%. Today the death rate for this condition is 7%.

Four factors are chiefly responsible for this saving in lives, the surgeons stated. In order of importance these are:

First, injection of fluids and salts into the patient's veins; second, decompression of the stomach and intestinal tract by the Miller-Abbott tube or other suction apparatus; third, improved recognition and treatment of the complications of ruptured appendix; and fourth, treatment with sulfa drugs and penicillin.

More lives might be saved, the surgeons suggest, by use of anti-blood clotting chemicals or tying off a vein in the leg to prevent pulmonary embolism or, as it sometimes popularly called, a clot in the lungs. This condition caused seven of 26 deaths in patients with abscess around the appendix at the time of operation. Most of these patients who developed pulmonary embolism were over 50 years of age.

No improvement in dealing with the problem of appendicitis has been made by the lay public or by the physicians consulted by patients before coming to the hospital, the surgeons pointed out. The number of patients who delay going to the hospital and, therefore, the number with ruptured appendix has not changed during the period surveyed. Twelve of the 23 patients who died of ruptured appendix in the period 1939-1947 had been seen by a physician more than 24 hours before going to the hospital.

In contrast to the 7% death rate from appendicitis with rupture, there were only two deaths in over 1,400 consecutive operations for simple acute appendicitis without rupture.

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PHYSICS

Study Cosmic Rays in Alps

➤ THE high-altitude laboratory at Pianrosa, near Cervinia in the Italian province of Aosta, may become an international center for European scientists studying cosmic rays. This was suggested at a recent conference on cosmic rays held in Cracow, Poland, under the auspices of UNESCO.

This laboratory, which was prefabricated and transported to a site nearly two miles high, includes both a large laboratory, 20 by 30 feet, and living accommodations for four persons. A cable railway connects it with a guest house 3,000 feet below. Food and materials are procured at the lower station and eight more persons can stay at the guest house. The unique laboratory is open all the year.

Director of the cosmic ray center is a young Italian scientist, Gilberto Bernardini, who will be a visiting professor at Columbia University in New York during the first six months of 1948. During his absence, Prof. E. Amaldi, director of the Nuclear Physics Center in Rome, and Dr. Ettore Pancini will be in charge.

Like American scientists studing cosmic rays, the Italians at their mountain laboratory are seeking to solve the mysteries of the meson, also called mesotron, a high-powered, short-lived particle found only in cosmic rays.

Prof. Bernardini said that he would welcome research workers from any country and that they would find a very congenial atmosphere—in spite of the many limitations which present conditions in Italy impose.

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SCIENCE SERVICE

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MEDICINE

Mold Remedy No Cure-All

There are a few known conditions for which streptomycin is effective but whether to use it is still a problem because this remedy is so new.

➤ IF you get tularemia, or rabbit fever, your doctor will almost certainly give you streptomycin. But if you get typhoid fever, he will not give you streptomycin. And if you get a blood stream infection or blood poisoning from a hemolytic streptococcus germ, he will give you penicillin.

The average layman, having read much about streptomycin, the powerful mold remedy, is likely to expect his doctor to prescribe it for almost any ailment. The average physician may at times be perplexed over whether to give or not to give streptomycin. The reason for the physician's perplexity is that this remedy is so new its exact place as a medicine has not yet been completely determined.

To help the physician, the *Journal of the American Medical Association* (Nov. 29) lists diseases and infections for which streptomycin is and is not good medicine.

The conditions for which streptomycin is effective almost all have long, unfamiliar names. They include, besides tularemia, urinary tract infections, wound infections and bacteremias (blood stream infections) due to Escherichia coli, Bacillus proteus, Pseudomonas aeruginosa, and Aerobacter aerogenes; plague; meningitis due to all gram-negative bacilli; infections due to Klebsiella pneumonia, and Shigella dysentery.

Streptomycin is reported occasionally effective, but penicillin is the drug of choice, in bacteremia and septicemia due to hemolytic streptococci; endocarditis (a kind of heart disease) due to green-producing streptococci; Staphylococcus aureus and albus infections, and anthrax.

Penicillin is not the drug of choice for diphtheria. Streptomycin may be effective, but is powerless against the toxin, so anti-toxin should always be the primary treatment.

Streptomycin is partially effective but the extent of its usefulness is still undetermined in whooping cough, tuberculosis, leprosy and gonorrhea.

Streptomycin is generally not to be used at present in typhoid fever, paratyphoid fever, amebic dysentery, undulant fever, toxoplasmosis, histoplasmosis, acute rheumatic fever, disseminated lupus erythematosus, localized lupus erythematosus, infectious mono-nucleosis, pemphigus, acute and chronic leukemia, ulcerative colitis, coccidioidomycosis, malaria, poliomyelitis and all other virus infections, blastomycosis, moniliasis, and syphilis.

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MEDICINE

Vitamin K Aids Chilblains

➤ NEW treatment for chilblains that your doctor may be using this winter consists in doses of vitamin K, the anti-bleeding vitamin. Favorable results with a trial of this treatment during the prolonged spell of severe weather in England last winter are reported by an English physician, Dr. D. P. Wheatley, in the *British Medical Journal* (Nov. 1).

Factor predisposing to chilblains are believed to be defective circulation in the extremities, increased permeability of the walls of the blood vessels and lessened clotting ability of the blood, Dr. Wheatley points out. Since these same abnormalities are present in persons deficient in vitamin K and are corrected by giving the vitamin, he thought it logical to try the vitamin as a remedy for chilblains.

One of his patients was a 37-year-old man who had suffered from chilblains "ever since he could remember." No other remedy had helped and when Dr. Wheatley saw him all his fingers and toes were dusky red and swollen, with signs of ulcers on several of the toes. He was given one injection into his muscles of a synthetic vitamin K. A week later he reported in delight that for the first time he had obtained relief from the chilblains. His fingers were normal and the toes had only a slight swelling left.

Complete relief of signs and symptoms was obtained in another three patients and improvement in four more. Although giving the vitamin by injection was considered better than giving it by mouth, the injections caused considerable pain and had to be abandoned.

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ZOOLOGY

Odd Newcomers Are Received by Chicago Zoo

➤ LIZARDS that walk on water and three-toed sloths are the oddest newcomers to the Chicago Park District's Lincoln Park Zoo, which boasts a new assortment of nearly 170 specimens from Central America.

The lizards, about two feet long, are basilisk lizards which have a sort of skimming walk as they travel over the water. Spanish-speaking natives call them "Jesus Christo." They live in trees and along the banks of streams in their native Central American habitat.

Sloths, the "upside down animals," come in both two-toed and three-toed varieties. But the three-toed ones collected by Oden and Olivia Meeker of Chicago and shipped to the zoo are the more rare specimens.

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NEWCOMER—This three-toed sloth was recently received at the Chicago Park District's Zoo in Lincoln Park. It is often referred to as the "upside down" animal and is the "Ai" of crossword puzzles.

ASTRONOMY

New Guider for Telescopes

This new automatic device operates through a photoelectric cell which is activated by a small part of the starlight which is reflected from within the telescope.

➤ GIANT telescopes used by astronomers will automatically follow the stars on which they are pointed by means of a new guiding device developed at Mount Wilson Observatory, Pasadena, Calif., by Horace W. Babcock. A description of the instrument appeared in the *Review of Scientific Instruments* (Nov.), a publication of the American Institute of Physics.

The heart of the new guiding device is a photoelectric cell which is activated by a small part of the starlight which is reflected from within the telescope. The cell, in turn, operates the mechanism to keep the telescope directed on the star. The guider is now in use on the Mount Wilson 100-inch telescope.

In photographic work with large telescopes, constant manual control is usually necessary. This is particularly true in spectrographic work, where the image of the star must be kept accurately on the spectrographic slit in the instrument through which light passes to form the star's spectrum. The new device is particularly valuable for this work because stars studied are generally brighter than the guide stars usually available in direct photography.

In spectrographic work, a part of the light of the star does not enter the slit but is reflected back by its polished knife-edge jaws. The new device uses a fraction of this reflected light. A small guiding telescope is used for observing the slit. Its eye-piece, where the image of the slit and star is formed, is converted into a scanning device by use of a small internal coaxial tube, mounted in ball bearings and rotated by a miniature motor.

Any deviation of the star from the axis of the rotating tube results in modulation of the light transmitted by the eyepiece into a multiplier-type phototube. The output of the tube therefore varies, and is used after amplification to operate the mechanism to adjust the pointing direction of the telescope.

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VETERINARY MEDICINE

Plan To Fence Off Border

Recommend vaccine made by International Commission to fight foot and mouth disease in Mexican cattle. Won't affect trade.

➤ DEFENSE against foot and mouth disease in Mexico, now that the war against the virus has settled into the long-drawn-out siege phase, may require fewer instead of more men, Dr. B. T. Simms, chief of the Bureau of Animal Industry, U. S. Department of Agriculture, stated in a Science Service interview. Operations will continue to be on an international basis, with American field men working alongside their Mexican colleagues in maintaining the strict quarantine that will be necessary.

Two lines of defense have been drawn up. One of them is deep in Mexican territory, from 350 to 700 miles south of the border, along the edge of the area of known infection. The second is along the border itself.

The project for a high woven-wire fence along the whole boundary, capable of preventing the crossing of either man or beast, which was proposed but not acted upon when the outbreak first occurred, has now been revived. An appropriation for its construction will be asked of Congress; Texas cattlemen are especially active in its support.

Such a fence will have value beyond simply preventing the unauthorized passage of possibly diseased cattle, Dr. Simms pointed out. Hoofed game animals, especially deer, are capable of carrying the virus, and it will be highly dangerous to have them freely crossing and re-crossing the border if the disease ever makes its way farther north. The fence should also be a material aid to the border patrol in checking illegal crossing of the boundary in either direction, particularly by smugglers.

Present commercial relations between the United States and Mexico will not be affected in any way by the foot-and-mouth quarantine, Dr. Simms stated. Practically no meat or green hides have been entering recently, and since the virus is destroyed in the tanning process it is quite safe to bring in Mexican leather goods.

Vaccine for Mexico's fight to save her cattle will either be made by the International Commission or by private firms under its supervision, if the Commission's recommendations are adopted by the Mexican government. Unsupervised vaccine manufacture is too apt to result in a product of low potency.

Up to now, foot-and-mouth disease vaccine has been made by inoculating animals, isolating the virus after they develop the disease, and reducing its power for ill by chemical treatment. Use of living animals makes the product costly. Lately experiments have given hope that it can be made in glass vessels, with the virus feeding on animal tissues obtained from slaughter-houses. If this works out, costs will be materially reduced.

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VETERINARY MEDICINE

Deer Are Worst Danger In Foot-Mouth Disease Area

➤ REPORTS that hoofed game animals may be infected wholesale in the Mexican foot-and-mouth disease area have aroused considerable interest among wildlife scientists. If wild animals do pick up the disease, the situation will become very serious.

Most probable victims would be deer, which are fairly numerous in the wilder parts of central Mexico. Deer would be very difficult to exterminate completely, since they run singly or in small groups and are quite skilled in hiding in brush and second-growth forest.

Antelope would present no great problem, for there are few or none of them in the area. They are animals of the open, much more easily hunted than deer, if ordinarily illegal means like jeeps and helicopters are used.

Wild pigs known as peccaries or javelinas may become infected. If they do, they should not be too difficult to run down and exterminate, for unlike deer and antelope they move and feed in compact herds.

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MEDICINE

Thyroid Saves Unborn

Daily doses of this gland extract have been found to help women who lose their babies prematurely to give birth to living infants.

➤ MANY of the women who lose their babies prematurely may be helped to give birth to living infants by small daily doses of thyroid extract. Studies showing this were reported by Dr. Eleanor Delfs of the Johns Hopkins School of Medicine to the Southern Medical Association meeting in Baltimore.

In 31 of 45 patients she studied, a deficiency of thyroid hormone was found. Deficiencies of a sex hormone and of vitamin E occurred in a few of the cases. The thyroid extract should be given starting three to four months before the woman undertakes to have a child and should be continued during the pregnancy. Failure to start the hormone treatment early enough probably accounts for disappointments in some cases in which it has been used in the past.

In addition to the hormone treatment, vigorous sports, strenuous activity and hard work are banned throughout pregnancy for these patients. Sedentary work and ordinary household duties are permitted, but the women are warned to avoid getting over-tired. It is usually not necessary for them to have long periods of rest in bed.

Of 39 patients who had previously had 155 pregnancies, only 12 bore living babies. These same women, after study and treatment, have borne 29 living infants in 43 pregnancies.

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AERONAUTICS

British Airliner Small Compared to Hercules

➤ THE British are boasting that their new Brabazon I airliner is bigger than anything which has yet flown, but it is far outclassed in size by the Hughes Hercules flying boat now under surface taxi tests, which recently made one short flight.

The Brabazon has a wingspan of 230 feet, the Hughes craft has a spread of 320 feet. The fuselage of the British airliner is 177 feet, the American flying boat is 220 feet long. Comparisons may not be exactly fair, for one will use landing fields, the other the water.

Although the British giant aircraft has not flown yet it is out of the hangar where it was constructed.

The Brabazon is a 126-ton craft, designed for passenger-carrying from London to New York. It will be able to accommodate 120 persons, or a total of 24,000 pounds.

The carrying capacity of the Hercules, primarily a cargo craft, is not yet known but is estimated to be four times that of the war-tested veteran Martin Mars which on one trip carried 35,000 pounds of cargo. The Mars is 220 feet in wingspan and approximately 117 feet in overall length.

Size alone is not the only point of interest in the eight-engine Hercules. It is of plywood construction rather than of the usual light metals such as aluminum and aluminum alloys. This plywood consists of built-up panels and beams of very thin sheets of wood, with each alternate layer laid crosswise, and the whole strongly bonded with a resin.

Hughes' Hercules flying boat, which has proved that it can fly, also has a rival in weight-carrying capacity in the new giant land-based Air Force transport, the Consolidated-Vultee XC-99, which is now undergoing flight tests.

The XC-99 is estimated to be able to carry 400 troops or 100,000 pounds of cargo. The Hughes boat could probably carry 600 troops.

The new XC-99 is a cargo brother of the B-36, the Air Force's biggest bomber, which is roughly 40% larger than the famed B-29 Superfortress. It will have a range of 1,500 miles fully loaded, but with reduced load can fly non-stop some 8,000 miles. This means that the bomber could take off from the new airport under construction in northeastern Maine, deliver bombs to western or central Europe and return without a stop.

While the XC-99 is designed particularly for cargo carrying, it can also be used for the transportation of airborne troops. It is powered by six Pratt-Whitney engines of the pusher type, turning 19-foot reversible-pitch propellers. It has a cruising speed of about 300 miles an hour. Its wingspan is 230 feet and its length is about four-fifths of this.

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RIVAL—In weight carrying capacity, this new giant transport rivals Hughes' Hercules flying boat. The Consolidated-Vultee XC-99 is the world's largest land-based plane and the Air Force's largest transport capable of carrying 100,000 pounds of cargo.

MEDICINE

Ruptures Repaired With Tantalum Wire Gauze

➤ SUCCESSFUL use of tantalum gauze for repair of ventral hernias, or ruptures, was announced by Dr. Amos R. Koontz of the Johns Hopkins School of Medicine at the meeting of the Southern Medical Association at Baltimore.

Tantalum has previously been used by surgeons in the form of wire for stitches and in plates or disks to repair skull defects. The supply of the metal in the form of gauze has until recently been very limited and at times it was not procurable at all. It is now available on the open market, Dr. Koontz has been informed.

Dr. Koontz uses the gauze in repair of large hernias where there is not enough of the patient's own tissues to close the defect, and in smaller ones where the surrounding tissues are weak. Most of the cases occur in very fat people. The tissues surrounding the hernia are often weakened by infiltration of fat.

The tantalum gauze is stitched over the hernial defect with tantalum wire stitches. Dr. Koontz first used the material to repair defects in dogs made by removal of six inches of muscle. Examination of the repaired defect several months after the operation showed that in each case it had become completely closed by the metal mesh with tissues growing through the meshes of the gauze in every place.

"A firmer and more thorough-going closure of the defect can scarcely be imagined," Dr. Koontz reported.

Following this experience with dogs, the tantalum gauze was used on five patients. The first operation was performed 17 months ago, the most recent six weeks ago. All have excellent results so far.

Two other surgeons, Dr. C. R. Lam of Detroit and Dr. T. D. Throckmorton of Des Moines, Ia., have told Dr. Koontz that they also had used tantalum gauze in a few cases of hernias.

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GENERAL SCIENCE

Science Writing Awards Of $1,000 Are Announced

➤ STORIES of blood research have won $1,000 George Westinghouse Science Writing Awards for George A. Keaney of the New York World-Telegram and Steven M. Spencer, associate editor of the Saturday Evening Post, the American Association for the Advancement of Science announced.

The second annual award for newspaper science writing was made to Mr. Keaney for his series of articles, "Blood —Still a Mystery of the Ages." The first magazine award went to Mr. Spencer for "New Hope for the Anemic," an article which appeared in the Saturday Evening Post.

Honorable mention in the magazine writing class was given to Drs. Lorus J. and Margery J. Milne of Burlington, Vt., for an article on life in the thin film of "dry water" found on the surface of bodies of water. Their prize-winning article was published in Natural History. No honorable mention award was made for newspaper writing.

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WILDLIFE

Game Animals Show Abundant Meat Yields

➤ MEAT no less than sport will be on the mind of every hunter now. Interest therefore attaches to data on the percentages of edible meat, in terms of live weight, obtainable from various game animals presented by Prof. W. J. Hamilton, Jr., of Cornell University. (*Journal of Wildlife Management,* Oct.)

Most precise studies were made on the carcasses of nine deer, brought in from various parts of New York and carefully dressed by skilled workmen. Calculated live weights ranged from 113 to 221 pounds, yielding from 55.7% to 60.6% of edible meat.

Largest animals on the average gave highest percentage yields in meat, Prof. Hamilton states. Number and position of wounds, and care in bleeding immediately after killing, he adds, affect amounts that have to be lost through trimming. Head and neck wounds are least wasteful of meat.

Of smaller mammals, the cottontail rabbit, most abundant of New York's game species, dresses 53.1% edible meat on the average. The snowshoe hare, a considerably larger animal, yields 58.2%. Gray squirrels, small though they are, produce 55% meat on their live-weight basis.

Applying his data to the known kill of game animals in New York during a typical pre-war year, Prof. Hamilton figures that hunters in this one state alone put about 22,270,000 pounds of meat on the table during a hunting season.

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IN SCIEN

AERONAUTICS

First Ram-Jet Helicopter Assigned to Military Use

See Front Cover

➤ THE latest addition to the United States Air Force's fleet of post-war aircraft is the world's first ram-jet helicopter which weighs only 310 pounds. It is shown on this week's cover of the SCIENCE NEWS LETTER.

The simplicity of construction and maintenance makes it an ideal aircraft for some military operations such as short-range observation, communications, artillery spotting and courier service.

The ram-jet helicopter was developed through the cooperation of the Air Force's Air Materiel Command, Wright Field, Dayton, Ohio, and McDonnell Aircraft Corporation, St. Louis, Mo.

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CHEMISTRY

New, Tough Paints Made From Sour Milk Acid

➤ IF YOU were looking for paint and were told you could find it in the milk-can, your first reaction might well be to look about in alarm to see how you had strayed onto a lunatic asylum's farm.

But that would not necessarily be the case. Chemists at the New York meeting of the American Chemical Society learned, from Dr. Paul D. Watson of the U. S. Department of Agriculture, of a whole series of tough, serviceable new paints produced from lactic acid, which is the stuff that makes sour milk sour. The acid, which can be produced in immense quantities from the whey that is a problem byproduct of the cheese industry, is polymerized and made into resins with fatty acids. These resins can be spread as paint-like films.

A new idea in house-paint pigments was also proposed by F. J. Williams and A. R. Pitrot of the National Lead Company. To get pigments that will keep their color longer and wear out more slowly, they prepare fine particles of silica, to which the monobasic sulfates and silicates of lead are chemically cemented. These present a defiant wearing surface to the weather.

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E FIELDS

PSYCHOLOGY

No Fatigue Measured After Six Hours of Reading

➤ WOULD you be tired if you read for six hours at a stretch? Would you be more tired if you read from a printed book or from projected microfilm?

The surprising answers were reported to the American Philosophical Society meeting in Philadelphia by President Leonard Carmichael, of Tufts College.

There is no measurable fatigue even after two six-hour periods of reading either from a book or from microfilm. And it doesn't make any difference whether the book is dull or interesting.

The conclusion was based on a photographic record 15 miles long showing every blink of the eye, every pause, during the six-hour reading. No sign of fatigue showed up at any time, and neither was there any change in comprehension of the meaning.

The experiment was conducted by President Carmichael and Prof. Walter F. Dearborn with a number of associates. Twenty college and high school students did the reading.

Science News Letter, December 6, 1947

GENERAL SCIENCE

Italian Scientists Lack Funds for Research

➤ SCIENTIFIC research in Italy which has produced such outstanding figures as Enrico Fermi, Bruno Rossi, Emilio Segre and B. Pontecorvo, to mention but a few physicists alone, is now languishing for lack of material support.

There are impressive new research buildings in the new University City, built prior to the war in Rome. Even those universities which were partly destroyed through military operations, such as those in Turin, Pisa and Bologna, have been rebuilt. But the apparatus for research is lacking.

Some radio instruments have been distributed recently from the surplus stores of the allied forces and they are much appreciated. There is a great shortage of scientific instruments, and the pay of the personnel is so low that they must take outside work to earn enough to live on.

The official salary of a university professor amounts to about $60 per month, and assistants get only half that sum.

Total expenditure by the Italian government upon research in all fields of science during the last year was only about $250,000, an entirely insufficient sum. If it were not for the financial help received from time to time from some of the larger industrial concerns such as Fiat, Snia Viscosa and Montecatini, research work in Italian universities might come to a standstill.

Yet, in spite of these conditions, a small number of enthusiasts, working under great hardship, are carrying on with their research in addition to their teaching duties and outside work.

Science News Letter, December 6, 1947

ENTOMOLOGY

Insect Control Measures Would Save Much Grain

➤ UNCLE SAM could feed Europe's hungry peoples without having to skimp at the home table if he would only get rid of a swarm of unwanted, useless free-lunch grabbers—the grain-eating insects.

Dr. H. L. Haller of the U. S. Bureau of Entomology and Plant Quarantine, speaking before the North Jersey section of the American Chemical Society, declared that full use of modern insect control measures would easily save 100,000,000 bushels of grain. Total insect depredations account for an annual loss of 300,000,000 bushels of grain in storage, worth at least $600,000,000. Hundred-percent control is hardly expected, but a saving of one-third the usual loss should be practicable, Dr. Haller declared.

Biggest savings can be made on the farm, for at present relatively few farmers take any protective measures against insects while they have their grain in storage, the speaker continued. Spraying wooden storage bins with persistent DDT solution is one thing farmers can easily do, he pointed out. While DDT cannot safely be used for making grain intended for food or stock feed bug-free, seed grain can be thus protected. Fumigation is the proper treatment for edible grain.

Along with protection of stored grain should go determined warfare in the field against such pests as corn borer, earworm, Japanese beetle and other insects.

Science News Letter, December 6, 1947

NUCLEAR PHYSICS

Atom Smasher Parts to Be Sunk Below Ground Level

➤ DANGEROUS radiation from a new atom-smasher being planned for immediate construction at the University of Washington in Seattle will be shielded against by the earth.

The electro-magnet, vacuum chamber and pumps of the new 200-ton cyclotron will be sunk below ground level. Thus, the earth will do the shielding job which expensive concrete or water-filled containers do in most other cyclotron installations.

The atom-smasher and building will cost an estimated $375,000. Hearts of helium atoms, called alpha particles, will be accelerated to approximately 40,000,000 electron volts by the cyclotron, while deutrons, hearts of heavy hydrogen atoms, will be accelerated to 20,000,000 electron volts.

Science News Letter, December 6, 1947

ASTRONOMY

Selecting New Location For Naval Observatory

➤ ASTRONOMERS at the Naval Observatory are concentrating, not on the heavens, but on the earth. Since last May they have been busy selecting a site for the proposed new observatory.

The exact location has not yet been determined, but it will undoubtedly be east of the Blue Ridge Mountains. In fact, it will probably be as near to the Nation's capital as an appropriate location can be found.

It was decided to relocate the Observatory in the East principally because Observatory officials must retain easy access to other scientific agencies in the East and keep in close touch with other Government agencies located here.

The observatory must be moved from its present site because the view of the sun and stars just isn't good enough. Since it was founded over a century ago, the Nation's capital has engulfed it. Smoke and dust from the city mar the view of the heavens. Light and heat from city streets and buildings "upset" observations.

One hundred acres of land, reasonably high and level with a knoll to raise the observatory above ground haze, are urgently needed. A fairly uniform distribution of clear weather and a small daily range in temperature are essential.

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AGRICULTURE

Good Neighbor Farms

Guatemala, through a collaborative program with the U. S., is conducting experiments to improve crops that are essential to feed the world.

By MARTHA G. MORROW

From Guatemala City

➤ THE search for better corn, beans and squashes has been carried back to the very birthplace of these vegetables. Through our collaborative program, intensive research on these and many other crops is being conducted in the populous Central American Republic of Guatemala.

Success will mean that the people of Guatemala can enjoy a more balanced diet. It will also result in better food varieties here at home.

Several agricultural research stations, located from the coast up to the volcanic highlands, are run by the Instituto Agropecuario Nacional. This National Agricultural Institute is a cooperative project of the governments of Guatemala and the United States. Everything from coffee, chief export of the country, to pasture grasses is studied here. Specific problems of the local farmer are also solved.

Outpost at Antigua

Iowa State College has an outpost at Antigua, ancient capital that several centuries ago was destroyed by earthquakes. Corn, cheapest food an Indian can get and his main source of sustenance, is the chief project here. Experiments in raising other crops common to the region are also being carried on.

Bananas, among Guatemala's most important exports, are not the only crop being investigated by the United Fruit Company on their extensive experimental farm. Trial plantings of teak trees and African oil palms are being established. They are also doing work on reforestation and cattle breeding.

Three experimental fields, chosen because of their different altitudes and soils, are run by the Instituto Agropecuario Nacional. The cone of volcano Atitlan looks down on Finca Chocola, a government farm of thousands of acres located about 2,800 feet above sea level. Part of this is utilized for experimental purposes. Situated on land sloping toward the Pacific Ocean, this plantation ("finca" means farm operated on a commercial scale) is blessed with sufficient water for complete irrigation, when needed.

The best varieties of coffee trees, most satisfactory shade trees to use in protecting them from the sun, economical use of fertilizer and cover crops to prevent soil erosion are all studied on this farm. Rubber and sugarcane are also being investigated. Around a hundred varieties of beans, radishes, peanuts, cucumbers, squash and peas were sown here.

Temperate-Zone Crops

At an elevation of 7,000 feet, temperate-zone crops are grown at Labor de Ovalle. Wheat, apples and plums are raised in this region where frost sometimes nips the buds or the ripening fruit. Livestock, particularly sheep, are also grown at this experimental substation high in the volcanic mountains of the department of Quezeltenango.

Near Guatemala City work is being carried on at Finca Barcena by the Instituto. The Escuela Nacional de Agricultura (National Agricultural School) is located there and the two collaborate in the work. This finca is about 5,000 feet above sea level.

In Guatemala there are only two seasons—the dry and wet. At Finca Barcena, the dry season often starts in October and lasts until early May. During this lengthy period of drought, most of the plants shrivel up and die; there is practically no water for irrigation. In the rainy season usually less than 40 inches of rain falls, as compared with 140 inches in some other sections of the country. Part of the land slopes gently so that machinery can be used for cultivation. But much, like that of the surrounding country, is too steep to be worked except by hand.

Sometimes work on a particular project is carried out cooperatively with farmers. Neighboring fields are operated at the expense of the Institute. Or finca owners and small-land farmers cooperate at their own expense, using the services of the agricultural experts.

The hope of the Institute is to do 75% research and 25% extension work, Dr. Rolland Lorenz, the newly-appointed director, told me.

The idea of establishing a collaborative Agricultural Experiment Station sponsored by the Government of Guatemala and by the Government of the United States of North America was conceived late in 1944. By March of the next year the embryonic project had progressed so well that the two governments formally signed an agreement setting up the Instituto Agropecuario Nacional.

The primary purpose of the organization is to work on crops that we cannot grow in the United States, yet are necessary to us and can be grown in Guatemala. Rubber, cinchona from which quinine is extracted, and certain medicinal plants stand high on the list. Varieties of wheat, corn and beans grown in our sister republic must be improved, on the other hand, to help feed the workers producing these complementary crops so essential if the American continent is to be self-sufficient.

Guatemala largely finances the proj-

COLLABORATING—Dr. I. E. Melhus, director of Iowa State College's Tropical Research Center at Antigua, ancient capital of Guatemala, is carrying on experiments that may help both nations.

RAISING CORN—In the highlands of Guatemala the Indian raises this crop as the chief product on his small plot. The search for better corn has been carried to its birthplace.

ect. The institute is staffed by our Department of Agriculture scientists and Guatemalan agriculturally trained technicians. U. S. experts in horticulture, chemistry, soils, animal husbandry, agronomy and plant pathology are aided by Guatemalan assistants, enhancing their knowledge of research and extension technique.

Eventually the project will be able to stand on its own feet. Technicians and financial support will be withdrawn by the United States, leaving local men to carry on the work thus established, Graham S. Quate, our agricultural attache, points out.

Ambassador to Guatemala

This phase of our Good Neighbor program fits in perfectly with the interests and background of our Ambassador to Guatemala. Ambassador Edwin J. Kyle is a farm-minded diplomat. For 33 years this tall, lanky Southerner served as dean of agriculture at Texas A. and M. His heart and soul are in this research pointing the way to better crops and improved livestock in Guatemala and the United States

Antigua was chosen by Iowa State College as a good place for research because many important plants grown in the United States originated in this region. Guatemala is believed to be the home of upland cotton, some kinds of corns, many varieties of beans, peppers, sweet potatoes and some squashes. It is also the land in which such flowers as zinnias, dahlias and cosmos originated, Dr. I. E. Melhus, director of the project, pointed out when I located him in his headquarters next to a beautiful 200-year-old church.

This outpost of the college is set up to carry on researches in economic plants grown in Iowa and the midwest, corn in particular. Searching for germ plasm that will enhance our corn varieties at home, the group of six hopes also to develop improved lines to be given to the people of Central America. Corn that looks promising has already been found, and improved grains taken back to Iowa where they are being tried.

The influence of climate on corn is being studied at experimental plots located from sea level to 8,000 feet. From work carried on in this country slightly smaller than New York State, the Iowa State group hopes eventually to predict what corn varieties will best be suited to different climates throughout the whole American continent. Light intensity in different areas is being measured. Some day the influences of light, temperature, moisture and soil on this important crop may be fully explained.

This summer about 10,000 corn crosses were made. Seed that show promise are shipped to El Salvador,

Do You Know?

The average family opens about 500 tin-coated steel *cans* a year.

The largest *frog* in the world is the one-foot long African frog of the Cameroons.

The existence of *electricity* was known for centuries before it was put to practical work.

Herring scales, and other fish material, furnish the so-called *pearl essence* which is used to coat artificial pearls.

Recognizing the importance of *helicopters* in air service, the American government has now liberalized regulations governing helicopter flights.

Photographs can be taken of a person in the dark without his knowledge provided invisible infra-red rays are used to "light" him and a specially sensitized film is used in the camera.

Honduras, Costa Rica and other countries interested in conducting their own experiments.

What is probably the largest collection of native corn varieties in the Western Hemisphere has been gathered by these scientists. Row upon row of corn, carefully dried and labeled, hangs from the roof of the storehouse.

Corn pests also stand high on the list for study. In particular, corn strains resistant to the European corn borer are being sought.

Seek New Varieties

The group is on the look-out for new fruits, vegetables and cereals that may prove useful in North America. A relative of our familiar cucumber, indigenous to the highlands of Guatemala, may be one of these. Called *cieba*, it grows upon a bush instead of hugging the ground. Thus in a small garden it takes no more room than a tomato plant.

Should you find "jam berries" on the market in the next year or two, credit this research station with introducing them. Called *atomate*, the green fruit tastes like a tomato and is about half its size. Used by the Indians as the basis of chile, it is good for salads, pies, jams and sauces.

Corn has been planted by Iowa State and rubber by U. S. Department of Agriculture experts at Tiquisate, the 23,000-acre finca of the United Fruit Company. This American company that dominates Central America's banana trade, however, is not only host to other groups but uses the West Coast finca for its own experiments.

Miles of Pipes

Miles upon miles of pipe greet the eye, for here the value of overhead irrigation, even in a land with plentiful rainfall, is being proved. Banana diseases may also be whipped through research conducted here. Bamboo is an important project as it is needed to prop up banana trees heavy with fruit.

Here one finds the African oil palm, one of the best sources for an excellent type of vegetable oil. Teak, mahogany, rosewood and tropical cedar claim space in the experimental plot. As disease attacks banana plants, the area becomes non-productive. Such plants as African oil palm and teakwood are considered good for planting in these sick areas.

Sisal and other fiber plants, needed for making sacks and bags to carry the heavy produce, are receiving attention in this research finca. Cowpeas, velvet-beans and peanuts also are to be found.

Developing and introducing crops to the small land-owner is an important project of the United Fruit Company, states A. L. Bump, one of the spark-plugs in this important research.

Today our brown-skinned neighbors eat corn, corn, corn. In the bright tomorrow they may have a diet as varied as our own. And our own diet may be improved through this research.

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if gasoline came on spools . . .

all the information you'd like to have about ingredients could be printed and pasted right on the spool. However, gasoline can't be labeled that way. So oil companies everywhere put "Ethyl" trade-marks on their pumps, to show you at a glance that their best gasoline contains "Ethyl" antiknock fluid. This important ingredient, which is made by the Ethyl Corporation, is mixed with gasoline to step up power and performance. Motorists who want to get the best out of their cars—new or old—look for the familiar yellow-and-black "Ethyl" emblem on the pump. *Ethyl Corporation, New York.*

look for the **"ETHYL"** trade-mark

Helping America's Progressive Petroleum Industry Make Better Gasoline

• Books of the Week •

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THE AMERICAN ANNUAL OF PHOTOGRAPHY—Frank R. Fraprie and Franklin I. Jordan—Vol. 62, 1948—*American Photographic Pub. Co.,* 216 p., illus., paper, $2.00; cloth, $3.00. Articles on various aspects of photography, together with numerous black-and-white photographic illustrations.

THE AMERICAN THESAURUS OF SLANG—Lester V. Berrey and Melvin Van den Bark—*Crowell,* 1174 p., with 57 p. supplement, $6.50. Arranged on the same plan of "Roget's Thesaurus," including definitions where needed.

A.S.T.M. STANDARDS ON TEXTILE MATERIALS (With Related Information)—1947 issue—*American Society for Testing Materials,* 515 p., illus., paper, $4.00.

BASIC TEACHINGS OF THE GREAT PHILOSOPHERS—S. E. Frost, Jr.—*Barnes and Noble,* 314 p., paper, $1.00. A comprehensive summary of the views of the great philosophers of all time, on the universe, man, the nature of God, good and evil, free will and other problems of enduring interest.

CHECKLIST OF THE COLEOPTEROUS INSECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES, AND SOUTH AMERICA: Part 5 Rich E. Blackwelder—U.S. National Museum Bulletin 185 — *Govt. Printing,* paper, 60 cents.

DISEASES OF THE NOSE, THROAT AND EAR—William Lincoln Ballenger, Howard Charles Ballenger, and John Jacob Ballenger—*Lea and Febiger,* 9th ed., 933 p., illus., $12.50.

DYNAMIC ASPECTS OF BIOCHEMISTRY—Ernest Baldwin —*Macmillan,* 456 p., $4.00. A text for a second course, with emphasis on subject matter exclusive of clinical problems.

EDUCATION IN GUATEMALA—Cameron D. Ebaugh—U. S. Office of Education, Bulletin 1947, No. 7—*Govt. Printing,* 82 p., paper, 25 cents.

ELEMENTS OF MINING—George J. Young—*McGraw-Hill,* 4th ed., 755 p., illus., $6.50.

THE EVOLUTION OF GOSSYPIUM AND THE DIFFERENTIATION OF THE CULTIVATED COTTONS—J. B. Hutchinson, R. A. Silow and S. G. Stephens—*Oxford Univ.,* 160 p., illus., $4.25. A study of the development of the cotton plant, based on twenty years' research.

FACING THE FACTS ABOUT CANCER—Dallas Johnson—*Public Affairs Comm.,* Pamphlet No. 38, rev., 31 p., illus., paper, 20 cents. The importance of physical examination and early diagnosis are stressed.

THE FOOT AND ANKLE—Philip Lewin—*Lea and Febiger,* 3rd ed., 847 p., illus., $11.00. A guide to the general practitioner in treating diseases of the foot and ankle.

400 YEARS OF A DOCTOR'S LIFE—George Rosen and Beate Caspari-Rosen—*Schuman,* 429 p., $5.00. More than 80 revealing passages from the vast literature of medical autobiography, giving a composite picture of the physician.

HEARING AND DEAFNESS: A Guide for Laymen — Hallowell Davis — *Murray Hill Books,* 496 p., illus., $5.00. This nontechnical analysis is intended for all concerned with hearing loss.

THE INFLUENCE OF SEA POWER IN WORLD WAR II—W. D. Puleston—*Yale Univ.,* 310 p., $5.00. The development of navies, and their role in World War II, considered in the light of guided missiles and atomic weapons.

JOBS FOR WOMEN OVER 35—Julietta K. Arthur—*Prentice-Hall,* 235 p., $3.50. Describes positions for which age is a positive asset or at least is not a handicap.

KLYSTRON TUBES—A. E. Harrison—*McGraw-Hill,* 271 p., $3.50. A theoretical text giving fundamental principles, with a basic knowledge of electronics assumed.

MATERIALS HANDBOOK—G. S. Brady—*McGraw-Hill,* 6th ed., 831 p., $7.00. Basic reference work on industrial materials, including detailed descriptions of each material and its uses.

MATHEMATICAL THEORY OF ROCKET FLIGHT—J. Barkley Rosser, Robert R. Newton, and George L. Gross—*McGraw-Hill,* 276 p., $4.50. A handbook for the scientist and text for those having little previous scientific training.

MATHEMATICS FOR ALL—Kaj L. Neilson—*Barnes and Noble,* 90 p., paper, 50 cents. Simply presented mathematics, from addition to logarithms, with some special applications, including computation of interest and discounts, and payments and annuities.

MATTER AND LIGHT: The New Physics—Louis de Broglie, trans. by W. H. Johnston—*Dover,* 300 p., $2.75. A Nobelist describes modern physics, including the atomic and quantum theories, in terms readily understandable by the layman; book originally issued in 1937.

METEOROLOGY FOR ALL—Irving Kohn—*Barnes and Noble,* 162 p., illus., paper, $1.00. An introduction to facts about the weather.

MICHIGAN BEAVER MANAGEMENT—G. W. Bradt—*Game Division, Michigan Department of Conservation,* 56 p., illus., paper. The description, the life and habits of beavers, told in text, photographs and clever cartoons. Free from Department of Conservation, Lansing 13, Mich.

THE MINERAL KEY—Howard B. Graves, Jr. — *McGraw-Hill,* 178 p., $4.00. A handy, pocket-sized referenece work to aid the amateur in the identification of mineral specimens.

MODERN BIOLOGY—Truman J. Moon, Paul B. Mann, and James H. Otto—*Holt,* 664 p., illus., $2.96. A comprehensive introductory biology text, including discussions of recent discoveries in medicine, chemistry, and bacteriology.

ON HOSPITALS—S. S. Goldwater—*Macmillan,* 395 p., illus., $9.00. Hospital administration and organization, relationships between hospital and doctor, patient, and community, and basic aspects of hospital planning.

140 MILLION PATIENTS—Carl Malmberg—*Reynal and Hitchcock,* 242 p., $2.75. What is wrong, in the author's opinion, with medicine as practiced today, and presents the case for a national program of compulsory health insurance.

YOUR TEETH AND HOW TO KEEP THEM—Jerome J. Miller—*Lantern* 232 p., illus., $3.00. All about teeth, their construction, pathology, and care; includes a detailed description of the development of the teeth throughout childhood and adolescence.

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 391. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

❁ *STEAM CLEANER, a portable type for cleaning automobile engines and chassis, floors, walls, building exteriors, henhouses and barns, is of welded construction and simple in design. It uses for heat either oil or gas, has a normal pressure of 100 pounds and a 90-gallon per hour water capacity.*

Science News Letter, December 6, 1947

❁ *JEEPS with attached plows for forest-fire fighting can dash to the scene at 65 miles an hour and lower their plow-disks for immediate action on arrival. Their two lister moldboards, with sharp root-cutting blades ahead, throw soil to the side to form a five-foot fire break.*

Science News Letter, December 6, 1947

❁ *COOKING UTENSILS, which resist food sticking to them, are made of two layers of stainless steel with a layer of copper between. The copper distributes the heat evenly throughout the utensil, overcoming the uneven heating in spots, the main cause of the food sticking to the pan.*

Science News Letter, December 6, 1947

❁ *TIRE INSPECTOR locates metallic particles buried in automobile tires in much the same way that electric detectors located explosive mines buried in the earth. The locating head of the device, which is passed slowly over the tire's surface, contains an electric coil on a plastic bobbin.*

Science News Letter, December 6, 1947

❁ *RUG SEAL is a liquid self-curing compound developed to hold together two pieces of carpet padding. It is applied to the squarecut edges of the padding; then the two pieces are laid on a flat surface and pushed together. After drying, a pull will tear the padding, as shown in the picture, before it opens the seam.*

Science News Letter, December 6, 1947

❁ *ELECTRIC DEVICE for hen houses, to shorten hours of darkness during winter months and thus increase egg production, automatically turns on small electric lamps one after another over a 15-minute period, and reverses action in the evening. It simulates sunrise and sunset conditions.*

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❁ *STOPPER FOR BOTTLES having a pressure relief device, just patented, has a central vertical opening extending through the stopper with a valve over the top and a button with an intake mouth over the bottom. A coil spring connects the two. When sufficient pressure forms within the bottle, the valve allows relief.*

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Modern *agriculture* requires continuous breeding of improved varieties of crop plants to prevent the decline of major crops.

Among land animals in the *Everglades National Park*, Florida, are black bears, deer, panthers, wildcats, raccoons and opossum; among amphibious animals are sea cows, otters, alligators and crocodiles.

Question Box

AERONAUTICS

What two planes challenge the size of the Hercules flying boat? p. 359.

ASTRONOMY

How does the new guider for telescopes operate? p. 358.

MEDICINE

For what diseases is streptomycin effective? p. 357.

How has firmer closure of ruptures been accomplished? p. 360.

How has the ruptured appendix hazard been reduced? p. 356.

What chemical cured lead poisoning? p. 355.

What gland extract may save lives of unborn infants? p. 359.

What new discovery may avert Rh blood death in babies? p. 355.

What vitamin may aid chilblains? p. 357.

PHYSICS

What laboratory may become an international cosmic ray center? p. 356.

VETERINARY MEDICINE

What two lines of defense have been drawn up against Mexico's cattle disease? p. 358.

What game animals are the worst danger for spreading the foot-mouth disease? p. 358.

Photographs: Cover, U. S. Air Force; p. 355, General Electric Co.; p. 359, U. S. Air Force; p. 363, Dept. of Agriculture.